Name:

## at1118paper: Complete the Square (v406)

### Example

By completing the square, find both solutions to the given equation:

$$x^2 - 32x = -252$$

Add $\left(\frac{-32}{2}\right)^2$, which equals 256, to both sides of the equation.

$$x^2 - 32x + 256 = 4$$

Factor the left side.

$$(x - 16)^2 = 4$$

Undo the squaring. We need to consider both $\pm\sqrt{4}$.

$$x - 16 = -2 \quad \text{or} \quad x - 16 = 2$$
$$x = 14 \quad \text{or} \quad x = 18$$

### Question 1

By completing the square, find both solutions to the given equation:

$$x^2 - 28x = -187$$

$$x^2 - 28x + 196 = 9$$
$$(x - 14)^2 = 9$$
$$x - 14 = \pm 3$$
$$x = 11 \quad \text{or} \quad x = 17$$

### Question 2

By completing the square, find both solutions to the given equation:

$$x^2 - 52x = 1088$$

$$x^2 - 52x + 676 = 1764$$
$$(x - 26)^2 = 1764$$
$$x - 26 = \pm 42$$
$$x = -16 \quad \text{or} \quad x = 68$$

## Question 3

By completing the square, find both solutions to the given equation:

$$x^2 - 6x = 475$$

$$x^2 - 6x + 9 = 484$$
$$(x-3)^2 = 484$$
$$x - 3 = \pm 22$$
$$x = -19 \quad \text{or} \quad x = 25$$

## Question 4

By completing the square, find both solutions to the given equation:

$$x^2 - 24x = -95$$

$$x^2 - 24x + 144 = 49$$
$$(x-12)^2 = 49$$
$$x - 12 = \pm 7$$
$$x = 5 \quad \text{or} \quad x = 19$$

## Question 5

By completing the square, find both solutions to the given equation:

$$x^2 + 22x = 720$$

$$x^2 + 22x + 121 = 841$$
$$(x+11)^2 = 841$$
$$x + 11 = \pm 29$$
$$x = -40 \quad \text{or} \quad x = 18$$

## Question 6

By completing the square, find both solutions to the given equation:

$$x^2 + 44x = -403$$

$$x^2 + 44x + 484 = 81$$
$$(x+22)^2 = 81$$
$$x + 22 = \pm 9$$
$$x = -31 \quad \text{or} \quad x = -13$$